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An Economic Life in Vain
− Path Dependence and East Germany's Pre- and Post-Unification Economic Stagnation −

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An Economic Life in Vain
– Path Dependence and East Germany's Pre- and Post-Unification Economic Stagnation –

Abstract

20 years after unification, the East German twin's economic position is relatively stagnant compared to most of the West German productivity and income variables. The strong initial takeoff until the mid-end 1990s ended at a level of 70% to 80% of the western reference. In this paper, two interdependent hypotheses are put to the test: (i) that the communist economy prior to unification was on a stagnating path contrary to what standard analyses show; (ii) that strong elements of path dependence exist and that the switch from plan to market offset the pre-unification stagnation but was not able to repair structural deficits inherited from the past. In fact, looking into West German long-term data, an extremely stable development path can be found that extends from the 19th century to the present. Thus, the analysis of the East German development path is both economically relevant and politically interesting if economic policies are to be formulated.

A series of East German output is recalculated to describe the macro-economic development relative to the West German twin. In doing so, assumptions are made on the initial starting point after World War II, the effects of the deterioration of product quality over time, the loss of international competitiveness and the unavailability of foreign goods on purchasing power. In fact, performance was very bleak, and growth came to an end in the 1970s of the last century. This coincides with fundamental changes in the world economy, the confiscation of the remaining parts of the private sector and an ever expanding subsidization of private consumption. This leads, in sharp contrast to findings by other authors, to a decline of real output until the mid 1980s, when fresh money was brought in from the West. At the end, East Germany collapsed on an economic level comparable to that of West Germany in the mid 1950s to early 1960s, depending on whether the external value of goods or internal purchasing powers are taken as a reference. In spite of overcoming the low starting point into the market economy during the first years, East Germany has swung back to its old development path extending from the 1950s and the 1960s. In fact, East Germany's economic effort did not reach beyond levels attained in the pre-war industrial district of central Germany – it was an economic life in vain.

Keywords: East Germany, time series, income, institution, product, unification, economic growth, convergence

JEL Classification: N0, O1, P2

Ökonomisch umsonst gelebt – Pfadabhängigkeit und Ostdeutschlands ökonomische Stagnation vor und nach der Einheit –

Zusammenfassung

20 Jahre nach dem Vollzug der Einheit stagniert die Wirtschaftsentwicklung des „ostdeutschen Zwillings“ im Vergleich zu westdeutschen Einkommens- und Produktionskennzahlen. Der starke Wachstumsschub bis in die Mitte der 1990er Jahre ebbte ab, und die Wirtschaft verharrt seitdem auf einem Niveau, das 70% bis 80% der westdeutschen Referenzgrößen entspricht. In diesem Beitrag werden zwei voneinander unabhängige Hypothesen überprüft: (i), dass bereits die kommunistische Wirtschaft Ostdeutschlands vor der Einheit auf einem Stagnationspfad war, ganz im Gegensatz zu dem, was andere Untersuchungen ausweisen; (ii), dass eine starke Pfadabhängigkeit existiert und der Umstieg von der Zentralverwaltungs- zur Marktwirtschaft nur diese vorangegangene Stagnationsphase kompensierte, die tiefer liegenden strukturellen Defizite aber nicht löste. Im Falle Westdeutschlands reicht ein stabiler Entwicklungspfad vom 19. Jahrhundert in die Gegenwart. Daher ist die Analyse des ostdeutschen Entwicklungspfads gleichzeitig ökonomisch relevant und wirtschaftspolitisch bedeutsam.

Die ostdeutsche Wirtschaftsleistung wird rekonstruiert, um die makroökonomische Entwicklung im Vergleich zu Westdeutschland zu beschreiben. Annahmen über den historischen Startpunkt nach dem Zweiten Weltkrieg, die für die Kaufkraft bedeutsamen Folgen der Verschlechterung der Produktqualität, den Verlust an internationaler Wettbewerbsfähigkeit und die fehlende Verfügbarkeit ausländischer Güter werden getroffen. Ebenso werden die fundamentalen Verschiebungen der Weltwirtschaft in den 1970er Jahren einbezogen, die mit einer Konfiszierungswelle mittelständischer Unternehmen in der DDR einhergehen; zeitgleich vollzieht sich ein starker Anstieg der Subventionierung der Konsumgüter durch den Staat. Im Gegensatz zu den Ergebnissen anderer Autoren vollzieht sich ab Anfang der 1970er Jahre ein Niedergang der wirtschaftlichen Leistung bis in die Mitte der 1980er Jahre. Als Ostdeutschland wirtschaftlich zusammenbricht, liegt seine wirtschaftliche Leistung auf einem Niveau, das sich zwischen der Mitte der 1950er und dem Beginn der 1960er Jahre Westdeutschlands einordnen lässt. Trotz einer zu Anfang der 1990er Jahre beachtlichen Aufbauleistung verläuft das gegenwärtige Wachstum entlang eines Pfads, der in den 1950er und 1960er Jahren begann. Nie erreichte das Land eine Wirtschaftsleistung, die die der mitteldeutschen Industrieregion vor dem Krieg übertraf.

Schlagwörter: Ostdeutschland, Einkommen, Institution, Einheit, Wachstum, Konvergenz

JEL-Klassifikation: N0, O1, P2

1. The Stagnating Twin: the German Economic Divide*

When on November 11th, 1989, the Iron Curtain melted away and the path to Unification was paved within less than a year, everybody foresaw a second "Wirtschaftswunder" in the new provinces of Germany, especially its southern parts that had been the industrial core of Central Germany between the Wars (IMF 1990). Today, 20 years and some 1,600 b € of transfers[1] to the East later, the idea begins to sink in that West and East Germany are on distinctly different growth paths. Even though some areas have progressed, average eastern per-capita income and productivity have stagnated at a level of about 70% to 80% of the west.[2]

What had happened? Had East Germany not qualified for the top ten of world economies as eighth to tenth largest economy of the world? If East Germany's economic performance is evaluated, one may only wonder. Table 1 provides evidence that per-capita products of the GDR were assessed by most scholars and intelligence units at a level of two third or higher of West German performance. Most sources gave the impression that a strong economy had developed east of the Iron Curtain. This opinion was upheld even 5 years after unification when the first economic problems cast their shadows: The 1989 productivity gap between the East and the West was set at only 50% (WERNER 1996).

Table 1:

East German Product as Share of West German Product					
Source	Year	pcGNP	Source	Year	pcGNP
DIW	1980	68%	CIA	1985	102%
World Bank	1980	53%	CIA	1986	76%
Maurer	1980	43%	Filip-Köhn/Ludwig	1988	57%
Summers/Heston	1980	80%	GDR	1988	78%
DIW	1983	76%	Ehrlich	1989	70%
Klinkmüller	1984	43%	DIW	1989	53%
GDR	1984	93%	Merkel/Wahl	1989	33%
Table accumulated from WEGENER (1995, p.45)					

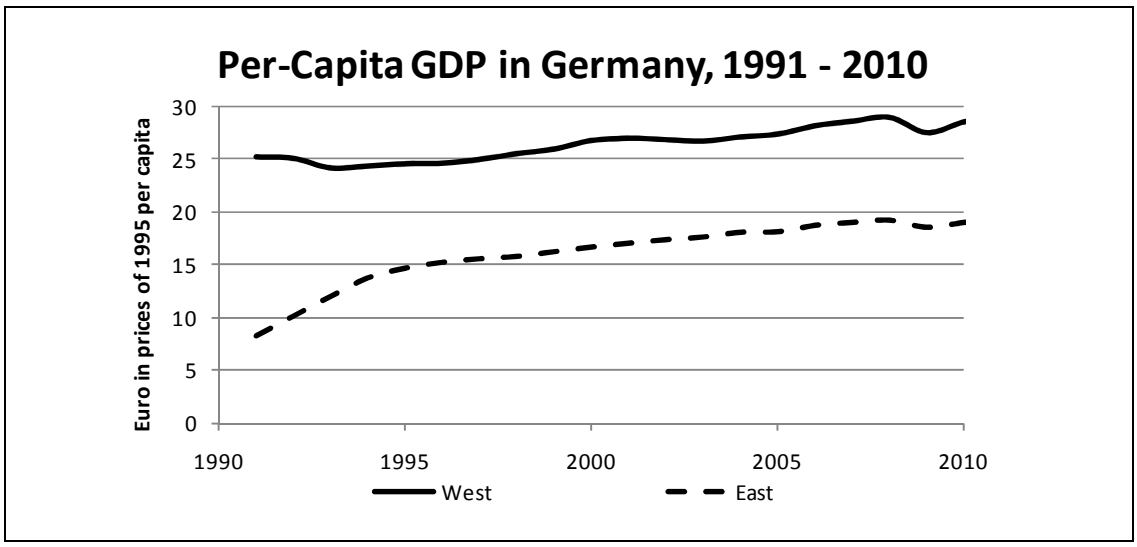
* The author is indebted to *Leonard Dudley, Makram El-Shagi, Hubert Gabrisch, Udo Ludwig* and *Friedrich Sell* for their important remarks on an earlier version of the paper. I owe special thanks to *Franz Kronthaler* and to *Guido Bünstorf* for their bright comments when drafting a first conference version. Three anonymous referees provided helpful insights that added value.

1 See *Blum, Ragnitz et al.* (2009); note that only about 10% of this sum is truly growth oriented; the majority reflects general budget responsibilities of government (social security, government salaries, etc.).

2 See *Lehmann, Ludwig, Ragnitz* (2005) and *Blum, Buscher et al.* (2009); average individual incomes are closer to 80% of the west, productivities closer to 70% because of differences in working hours and the half-time jobs.

In fact, the seemingly impressive initial growth of the new provinces after Unification underpinned this impression and led to a loss of perception of the true low potentials of East Germany. As Figure 2 shows, growth stalled after 1997. Ever since, the talking of a second "Wirtschaftswunder" has ceased and was replaced by pessimism. Some even argued that economic output, at the end of the 1990s, had just reached the levels of the GDR of 1989, at the eve of its collapse (DIW, IfW, IWH 1999; SMOLNY 2003).

Figure 1:



Source: Volkswirtschaftliche Gesamtrechnung der Länder, File R1B1, Destatis.

In this study, it is argued that the data presented in Table 1 – with the exception of Merkel-Wahl – strongly overstated East Germany's economic position. It is further argued that structural problems East Germany established in the fifties and sixties still extend to the present. Economic collapse was the result of ill policies that wanted to overcome these structural deficiencies through the further centralization of the economy. However, this only aggravated the situation and necessitated a first economic bail-out by West Germany in the early eighties. The initial take-off after unification resolved the problems of missing market orientation but not the fundamental structural problems. Unless these deficiencies are overcome, there is no reason to believe that East Germany can further converge to the West German output level. Clearly, this approach departs from the three most important standard explanations of East Germany's present stagnation:

- The overvaluation of the East German Mark in the process of monetary union: Because of monetary union and the resulting revaluation effect the capital stock devalued and unit labor costs exploded. This destroyed competitiveness (NÖLLING 1991; SINN, SINN 1992). AKERLOF et al. (1991) assumed that, given the export productivity measured by East Germany, less than one fifth of industry could survive a 1:1 exchange rate.
- Fundamental limits of absorptive capacity: Transfers given to stabilize private households and encourage investments led according to another school of

thought to adverse transfer effects that crippled further economic expansion (GREINER, MAASS, SELL 1994; BLUM, SCHARFE, 2002; BLUM 2009). As GABRISCH, HÖLSCHER (2006, pp 163-164) point out that the problems of the transfer economy are aggravated by soft budgets constraints which are known from KORNAI (1980) as an important reason for economic slack.

- Misguided public investment incentives: The encouragement of capital-intensive investments according to a third line of argument runs against the "golden rule of accumulation" (PHELPS 1961) and increases, (i), production inefficiencies on the level of the East German economy and, (ii), unemployment levels that burden public budgets.
- Forced anti-inflationary policies by the Bundesbank: According to forth line of arguments, economic convergence between the East and the West was halted as the Bundesbank had increased interest rates to limit inflationary tendencies which developed because of the deficit spending of the Federal Government to finance Unification. When Germany introduced the Euro with an exchange rate that had risen against its European partners, the loss of international competitiveness hurt the adaptation process of the East (BLUM, LUDWIG 2005).

This approach acknowledges these explanations. It accepts that the initial start was also impressive because of changes in the accounting standards from the material product system (MPS) to the system of national accounts (SNA). However, East Germany to the present has not overcome deficiencies institutionalized by the communist system in the fifties and sixties as described by BLUM and DUDLEY (1999, 2000): the symptoms were a less productive human capital, a less dynamic innovation milieu[3] and missing headquarter facilities[4] that made West Germany profit which attracted these resources until the Wall shut off the East – and again after Unification. Even today, migrants boost their income because they can engage in more productive networks (UHLIG 2006). Gender-specific preferences for migration may undermine the long-term basis of the East German economy (SCHNEIDER, KUBIS 2010). HALL and LUDWIG (2009) argue in the context of a cumulative causation system that backwash and spread effects make the West benefit at the expense of the East.

The remainder of the paper is organized as follows. In the second chapter gives a brief analysis of the reported growth performances of West and East Germany after the war.

3 Many cars in East and West Germany were rather similar, as they shared common ancestors – just like consumer electrics, electronics or other industrial products. Some industries were even able to preserve this, i.e. Zeiss in Jena, the original location, compared to Zeiss in Oberkochen, Baden-Württemberg, were many managers and researchers fled to.

4 All large German public companies (DAX-30) have their headquarters outside East Germany. Only one DAX-100 company has its company seat in the East (Berlin). Before the war, well-known global players dominated the then Central German Business District like Siemens, Deutsche Bank, Allianz, Audi (Auto Union), Zeiss, just to name some famous names.

Based on official statistics it is impossible to explain East Germany's economic failure and the resulting economic problems of Unification. The third and fourth chapters are devoted to the methodology and the results estimation of a quality-corrected, market-related GDP-series for East Germany. By extending the series with officially reported data after 1990 to the present, the hypothesis of long-term path dependence of East Germany's economic development is tested.

2. Economic Development in West and East Germany

There exist no official data on the economic differences in starting points of the two German twins measured in GDP when they separated formally with the foundation of the German Federal Republic and the German Democratic Republic in 1949. Monetary reform in the West (DM, Deutsche Mark) followed by monetary reform in the East, both in 1948, had cemented a division that had been politically decided before. [5] For the smaller East German twin, deliberate autarky policies aggravated the situation of cuts in the division of labor with West Germany and the lost territories of Silesia, Pommerania and East Prussia. The economic catastrophe was especially felt in the hard winter of 1947 (JUDT, 2005, 46-47). Thus, strong evidence suggests that the starting point of East Germany was much lower than that of West Germany.

- The specific economic divide was hardest felt in the Berlin area already in the years before, as parts of the population worked in western zones and lived in the east and vice versa. In 1948, the first exchange rate of about 1:3 deteriorated to between 1:4 and 1:5 until 1949 when it stabilized again. Income differentials in terms of purchasing power run at about 1:4 to 1:5. The 1950 exchange rate in Berlin of about 1:3 in Berlin[6] gives a hint on the relative performance differences which, of course, are harder felt in urban than in rural areas, as most of production was in non-tradable or non-traded goods. However, the East German government, until unification, maintained the fiction of a 1:1 exchange rate.[7]
- SLEIFER (2006) provides data on the economic costs of the war within the boundaries of the two parts of Germany, which were later separated. Table 2 documents that the loss of capital was extremely high in the East that was, before the war, marginally better developed: after the wall, the shortfall was some 30% to 40%. Table 3 reinforces this as war damage in the East is 68% higher

5 East Germany' currency had different names over time: DM as "Deutsche Mark der Deutschen Notenbank" between 1948 and 1964, MDN as "Mark der Deutschen Notenbank" between 1964 and 1967, and M, "Mark" until 1990.

6 *Landeszentralbank Berlin-Brandenburg* (1998, p. 72 and p. 89) gives a precise account on the monetary split in Berlin that developed when, in the Western zones, the DM monetary system was introduced, which led to problems in Berlin where the western and eastern zones intensively met, for instance because of western employees working in the east and vice versa.

7 Visitors from West Germany were forced to exchange at 1:1 („Zwangsumtausch").

than in the West because the loss in production capacity was also due to reparations and dismantling of industries by the Soviets.

Table 2:

Industrial Capital Stock, Germany				
	1936	1944	1948	1950
West Germany	100	136	113	122
East Germany	100	138	69	72

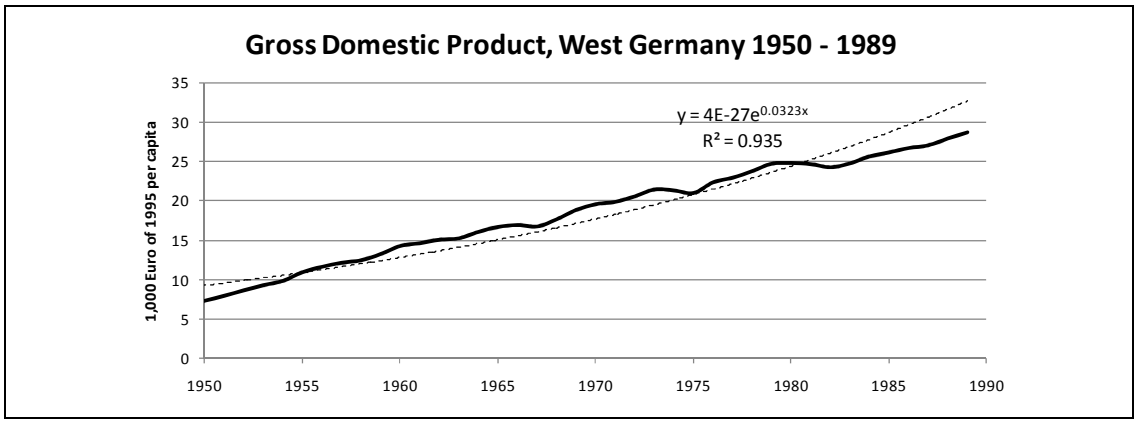
Source: Sleifer, 2006, p. 72, Reichsmark prices of 1936.

Table 3:

Per-Capita War Damage in Germany until 1953		
	West	East
War Damage	839	686
Dismantling of Industries	60	384
Reparations	23	1,065
Occupation Cost	689	649
Total	1,611	2,784

Source: Sleifer, 2006, p. 73, Reichsmark prices of 1944.

Figure 2:



Source: Own calculations with data from Statistical Office of Germany (1991).

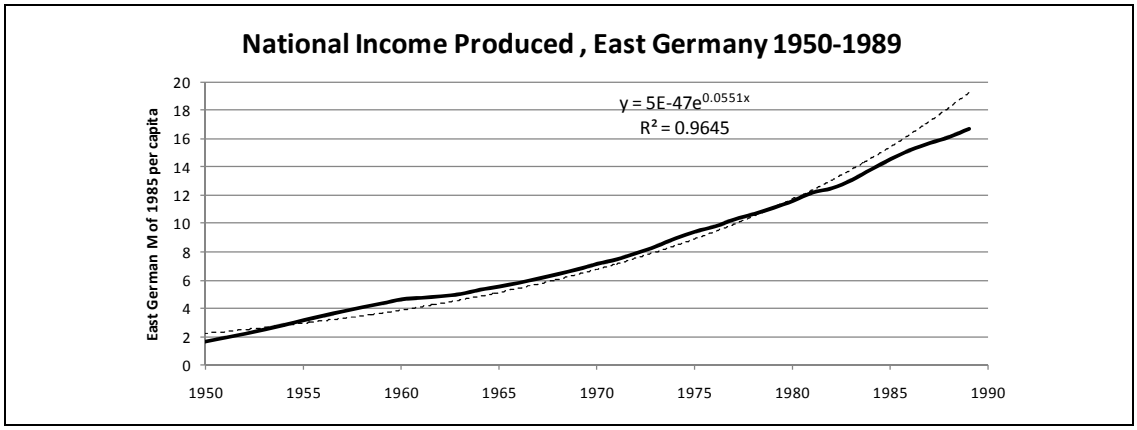
From official West German national accounts of economic output, measured by GDP, an average annual growth rate between 1950 and 1989 of 3.5 % (see Figure 2) is calculated. The East German per-capita income series, measured in "National Income Produced[8]", implies an annual growth rate of 5.5 % – roughly 2 percentage points higher (see Figure 3). This implies that any adverse starting point after the war should have

8 Produziertes Nationaleinkommen

been offset by the growth dynamics of the eastern twin – and Unification should never have been an economic problem.[9] Different explanations can be offered:

- The accounting system:[10] All material products of a period produced in productive sectors of the economy, evaluated at administered process, are included in the "Global Product"[11] (GP) which thus comes close to a gross value added concept. If depreciations and deliveries are subtracted, the "National Income Produced" (NIP) is derived which comes close to the net domestic product.
- The missing of sectors with potentially reduced dynamics: As the MPS system excludes certain service sectors as unproductive and as these sectors, not being on the focus of planners as driving the system, thus were not expanding as fast as in market economies, this could reduce total dynamics. However, comparing employment development in the total economy and in industry would not support this, as Table 4 shows: Total employment rose faster than employment in industry – and nonproductive sector comprised some 0.9 m employees in 1949 and doubled until 1988 – then about 20% of total employment.

Figure 3:



Source: Own calculations with data from Statistical Yearbook of East Germany 1989 (1990).

Table 4:

Development of Employment, East Germany 1949 - 1988							
Sector	Total	Industry	Comm.	Retail	Agric.	Crafts	Nonprod.
Growth %	0.0039	0.0093	0.0076	0.0029	-0.0220	-0.0233	0.0164

Source: Own calculations with data from Statistical Yearbook of East Germany, 1989.

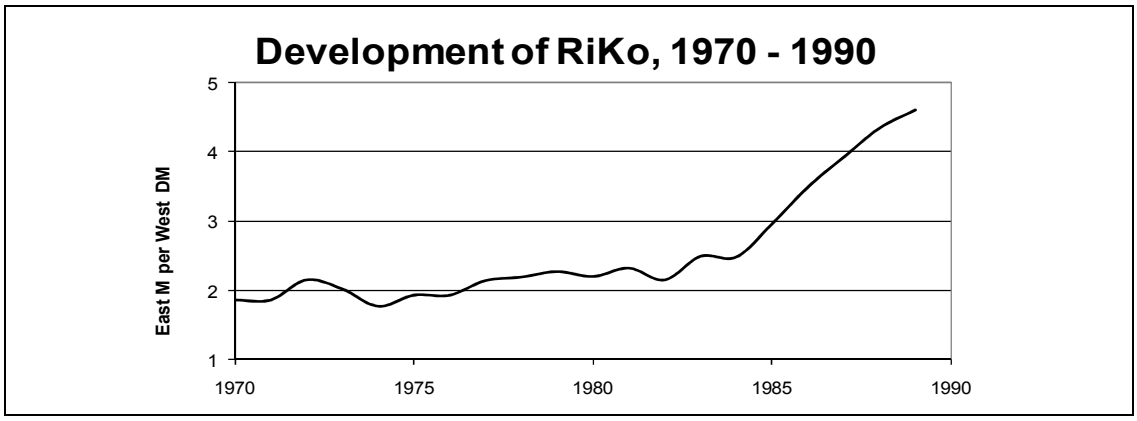
9 If East Germany had had a level of 44% of the West, it would have, given these growth differentials, pulled even by 1989.

10 For a description of the MPS accounting standard see *United Nations* (1971).

11 Literally "Societal Total Product" (Gesellschaftliches Gesamtprodukt)

From a market perspective, it is obviously known that MPS data lacks credibility as markets that may properly value goods are missing. However, Figure 3 seemingly shows a systematic problem of strongly overestimating economic performance. An exchange rate of 1:3 between the twins in 1950 directly translates into economic performance differentials; then East Germany would have been at 73% of the Western level by 1989. This value is close to the estimations given by some of the sources in Table 1. It would further have implied that East German output collapsed by roughly 50% during the transition months. However, this contradicts facts like the exchange rates between the East and the West German Mark of 1989 that was about 1:3, the first measurement of East German output in 1991, under market conditions, that put it at about one third of the West German level, and the international output performance of East Germany: In fact "direction coefficient" (Richtungskoeffizient, RiKo), an East-German shadow exchange rate measuring the amount of East German marks necessary to Earn a West German DM on capitalist markets, had passed the value of four and, thus, had more than doubled since 1968 (SCHALK-GOLODKOWSKI, KÖNIG 1988). This implies not only a loss of competitiveness but an increasing loss of access to desired imports by consumers for reasons of lack of foreign cash. Following DEUTSCHE BUNDESBANK (1999), exports and imports accounted for about 25% - 30% of total output[12].

Figure 4:



Source: Schalk-Golodkowski, König 1988; Schürer et al 1989.

Seemingly, there is a contradiction between the economic starting point of East Germany and its final point that has to be resolved if the long-term path of East German economic development is to be outlined. The computation of an output measure related to market values in a rather closed economy is futile if exchange rates are used. Purchasing power parities only are an unsatisfactory solution. Of course, they are able to make standards of living comparable, especially in the case of East Germany, where wages

12 Exports and imports were overvalued in East Germany's price system. The percentage span calculated by *Deutsche Bundesbank* assesses exports and imports in prices comparable to domestic pricing.

were low and many goods for primary needs were highly subsidized.[13] In case of transition, this implies that through the introduction of market prices the mix between local and tradable goods changes: Formerly international goods may be even hard to trade locally and many until then local goods come under pressure from imports because of new logistics technologies. In fact, especially the highly subsidized sectors showed the strongest inflationary dynamics (NIERHAUS 2001, Figure 2). The true value of East German performance should was somewhere between the internal purchasing power – up to two thirds of the western twin if quality is not accounted for – and below 25%, as set by the direction coefficient.[14]

3. Recalculating East German Output: Methodology

3.1 Data Availability for German Economic Development

Long-term data for the development of national economics were published by MADDISON (1995) in -values of 1990. In provides per-capita products of Germany (German Reich until end of WW-II; afterwards West Germany) between 1820 and 1994. In the MADDISON study, the GEARY-KHAMIS approach was used to ensure the transitivity of currency exchange values. Here, this property is not required. This series was updated to the year 2003 (MADDISON 2007), and now it includes United Germany after WW-II.

These data cover the period 1900 to 1990 of this study and were extended the series by using official GDP statistics for West Germany for the years 1991 to 2010. The latter are given in prices of 1990 and had to be rebased to 1995 and translated the data into Euros to adapt them to the present monetary system. [15]

Calculating comparable GDP values for East Germany is much more complex as a method must be found to convert socialist/communist accounting from the material product system (MPS) to the system of national accounts (SNA) of market systems. Different approaches were used by researchers, for instance

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13 The personal income value of these subsidies amounted to 64 % of wages paid to workers in 1988; see *Haustein* (1990, p. 209). This effect of a "second wage bag" (zweite Lohntüte) brought public finances under stress and lead to an expansion of consumption without any sound basis in the production sphere; see *Schwarzer* (1999, pp. 175 – 183).

14 It may be argued that the hardships incurred to leave the system – from imprisonment to being shot – are sign of very high opportunity costs of living in the East German system. After the Berlin Wall was built, more than 30,000 political prisoners were bought free by the West German government for prices averaging 20,000 Euro at the beginning and 100,000 Euro shortly before nification.

15 If we compare for the period of 1950 to 1989 the correlation between the *Maddison* series ($ of 1990) and the official series from *Bundesbank* (€ of 1995), the correlation is r = 0,99. The factor applied for recalculating the 1990-based to 1995 was *1.257*.

- the revaluation of MPS or SNA quantities with market values: This, however, ignores all what is known about price-quantity (-quality) interdependencies and leads to an overvaluation of highly subsidized local goods in markets in contrast to internationally tradable goods, especially with high technological content, which were underrepresented in the consumer basket because they were extremely costly or non-existent in communist countries. Such an approach with sets of deflators was used by RITSCHL and SPOERER (1997) or LUDWIG, STAHMER and STÄGLIN (1996).
- the correction of aggregates of output with the international value of goods: As mentioned above, East Germany calculated for its products traded to the west how many East German Marks were necessary to earn one West German Mark, the so-called direction coefficient. This value was 1.86 in 1979 and rose to 4.6 in 1989. The latter value implies that East Germany had about one fifth of the external productivity of the West (SCHALCK-GOLODKOWSKI, KÖNIG 1988; SCHÜRER et al., 1989). As the productivity of local goods – irrespective of their quality – was somewhat higher, an overall level of productivity of one third of the west (FILIP-KÖHN, LUDWIG 1990) can be assumed as upper limit.
- the quality correction of products: This assumes that a strong decay in quality can be identified and, thus, output value is exaggerated; in the nineties, this phenomenon was addressed by the US Senate with a view on the adaptation of pensions to inflation (BOSKIN et al. 1998).

Given the enormous span of output estimations, a disaggregate approach that recompiles the goods consumed or the goods produced and, thus, the existing industry structure based on market prices, seems inappropriate. This paper takes up the idea of a quality correction of aggregate output. It starts with East German MPS data on net output, adds depreciations and compensates for non-accounted "unproductive" sectors to obtain a first raw GDP proxy. In a second step, a quality correction is applied by using a methodology applied before by BLUM and DUDLEY (1999). In doing so, it acknowledges the impossibility of properly establishing, in terms of microeconomic equilibrium theory, an internally consistent market output by re-evaluating output based on goods or sectors. HESKE (2005) has recently published series that include a quality correction which will be inquired into at the end of this study.

3.2 Calculation of an MPS-Based GDP for East Germany

Production data of East Germany is based on the material product system (MPS)[16]. It covers what are assumed to be the "productive" areas of the economy and, thus, exclude many service and public activities. This can best be shown with East German employ-

16 The Statistical Yearbooks of the GDR contain a thorough description of the methodology of calculating national income data.

ment data which distinguishes between the sectors monitored by national accounting ("productive sectors")[17] and those excluded ("non-productive sectors"). Most of the expansion of the East German labor force took place in non-productive sectors (see Table 4).[18] Figure 5 shows the development of population and employment according to these categories.

Data of the productive sectors depart from a Global Product from which depreciations and deliveries from other sectors are subtracted to obtain the National Income Produced.[19] By adding depreciations in productive sectors, a "Gross Income Produced" is obtained. If productivities (better: salaries) are assumed to be about the same across all sectors (including non-productive sectors[20]), the data series only based on productive output employment can be expanded to a "Gross Domestic Material Product" (GDMP).

Figure 5:

Source: Own calculations with data from Stat. Yearbook of East Germany 1989 (1990).

The Statistical office of Germany (STATISTISCHES BUNDESAMT 2000, p. 89) had recalculated East German MPS data into SNA BIP data (in East German Marks, nominal prices). They calculate a per-capita income of 16,555 M for 1985 – the year of price basis of official East German Statistics. The value calculated here for 1985 is 17.706 M, some 6% higher.

17 These include manufacturing, mining and handicrafts, agriculture and forestry, construction, retail, transportation and communication services.

18 The data excludes some 0.4 m apprentices.

19 The Statistical Yearbook of the GDR for the Year 1989 gives a good overview on these national aggregates on page 100; for terminology, see *United Nations*, 1971, p. 98.

20 See Statistical Yearbook of the German Democratic Republic 1989 (1990), p. 129 shows that the variation of salaries across sectors is minimal: In 1988, average monthly salaries were 1,280 M; highest monthly salaries were paid in transportation (1,405 M), lowest in retail (1,134 M).

The starting point of the series in 1950 is of crucial importance for the calculation of the economic development path. As prices in the late forties and early fifties were less distorted than from the seventies onwards, a comparison between West and East in terms of living standards or exchange rates gives a good sign whether the results calculated make economic sense.[21] Following the methodology described above, the different steps are shown in first eight lines of Table 5 for the starting and the final points, 1950 and 1988. The resulting 1950 East German per-capita GDP in East German Mark was 2,205 M. As a validation, the 1950 exchange rate of 1:3 is applied to the West German 1950 per-capita GDP. The resulting East German DM value would be 2,691 DM in 1950. In fact, the GDR-Mark value is somewhat below the 1:3 exchange rate. The closeness of the two values is evidence of the initial political will of the East German government to maintain – even under conditions of different economic performance – the fiction of price level parity.[22]

The lagged economic starting point of East Germany in 1950, more than two thirds below the West German level which was able to match its pre-war economic level by 1953, has been observed by East German economists. They especially stress the loss of skilled workers as a cause for economic problems (BARTHEL 1979, p. 51). The advantage of an initially more modern and less destroyed stock of capital (JUDT 2005, p. 85-86) could not be exploited. The inability to access the Marshall funds from 1948 onwards prevented a modernization program from which the West German twin profited.[23] To the contrary: In the East the respective firms were relentlessly dismantled and shipped to the Soviet Union as part of reparations (see Tables 2 and 3).[24] Even under normal conditions the data of SLEIFER (2006) suggests that East Germany's output

21 After *Honecker* took power in 1971, systematic subsidizations of basic goods were introduced to pretend a stable price level. The stability of prices became a strategy of social policy. For basic needs, price caps were set at 1944 price levels (which were in fact 1936 price levels). Subsidies increased from 8.5 million East German Mark in 1970 to 50 million East German Mark until 1988. This was about 10% of the public budget in 1971 and 18% in 1988. See Statistical Yearbook of the GDR 1989, p. 276.

22 Following the purchasing power parity argument of trade theory, exchange rates reflect purchasing powers. Assume that the value of a standard good is separated into a price (P) and a term that reflects quality (Q) or general availability of goods. Then the exchange rate (w) between East Germany (WG) and West Germany (WG) is

$w = \frac{P_{EG} / Q_{EG}}{P_{WG} / Q_{WG}} = 3$. Assuming equal prices, quality in East Germany would be one third as would be the true market value of aggregate market-valued output.

23 Between 1948 and 1952, West Germany obtained about 1,4 b US-$ in aid, about 20% of the total sum. At that time, this was worth about 6 b DM.

24 *Baar et al.* (1995, p. 965) set the lag at only 16%. Both private consumption and investments lag against the west by 37% and 36% – it is public consumption that is 170% of the West German level that pulls the total (and it increases until 1955 to 225%). Public consumption is mainly salaries and is included in national products at costs. According to the same source (p. 962) 12,5% of output were captured by the Soviet Union. We may add "forced depreciations" because of dismantling of capital stock shipped to the Soviet Union which additionally lowers output measured in PNI or in GDP.

should have been at 50% of the West at a maximum. The starting point chosen here is some 20 percentage points below that of other studies.[25]

Table 5:

National Accounting Positions of East Germany, 1950 and 1988		
Income Aggregate (all values in millions)	1950	1988
	prices of 1985	
1. National Income Produced (NIP), in GDR-Mark	30,352	268,060
2. Depreciations, in GDR-Mark	5,642	31,130
3. Gross Income Produced (GIP), in GDR-Mark	35,994	299,190
4. Nonproductive sectors*, in GDR-Mark	4,496	64,127
5. Gross Dom. Mat. Product (GDMP), in GDR-Mark	40,490	363,317
6. Per-capita GDMP, in GDR-Mark	2,205	21,788
7. Per-Capita GDP assuming exchange rate 1:3 (DM)	2,691	

* 1950: +12,5%; 1988: +21,4%.

Source: Statistical Yearbook of East Germany 1989; (1990) Statistical Yearbook of Germany 1990, own calculations.

4. Recalculating East German Output: Quality Correction and Results

4.1 The Role of Quality in Output Measurement

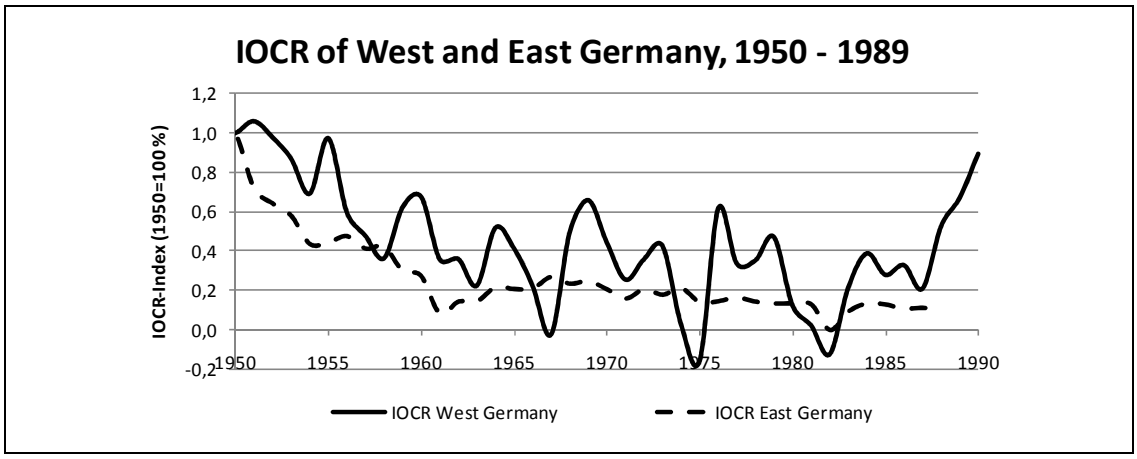
In a previous paper BLUM and DUDLEY (1999) have addressed the problem of quality changes in the East German economy versus the West German economy. The methodology is taken up and deepened here in order to calculate a market-oriented measure of per-capita GDP.[26] As mentioned before, output of East and West Germany was initially rather similar because of common technological roots. The more East Germany secluded itself from international competition and lost access to frontier technologies, the more the quality of its output should fall. This may lead to a vicious cycle as investment goods, produced with an underperforming stock of capital, will lower the performance of the economy for the next generation. In fact, to the extent that quality improvements and new products did not occur in East Germany as did in the West – and presumably were under-reported, traditional growth rate comparisons will provide an overly favorable image of the planned economies. Assuming that a declining marginal capital productivity can be used as a sign of falling technology efficiency, a fall of quality of current output can be tracked. If East German marginal capital productivities are relate to those

25 See *Ritschl, Spoerer* (1997) and *Sleifer* (2006).

26 In terms of methodology, the data source was partly updated (*Statistische Ämter der Länder 2006; Arbeitskreis Volkswirtschaftliche Gesamtrechnungen der Länder* 2009), the model structure was checked against other specifications and a sensitivity and confidence analysis was added.

of the West German twin, a development path of quality change – in fact: deterioration – can be obtained. Given the fact that even East Germany was forced to acquire a considerable share of inputs from capitalist markets and that even certain goods, especially raw materials, were traded in the COMECON at prices related to the capitalist world, this cross comparison seems acceptable. Figure 6 gives the results of the series, both transformed into an index (1950 = 100) to ease comparability.[27] Given the nature of the two economic systems, the series from East Germany is much smoother than that of West Germany which is ridden by investment and business cycles.

Figure 6:



Source: Stat. Yearbook of East Germany 1989 (1990); Stat. Office of the Federal Republic of Germany (1991).

4.2 The Econometric Model

Let Y represent the value of East-German aggregate production at world prices and V represent the volume of output measured by official statistics. If the data can be assumed to be free of deliberate manipulation, then any significant discrepancy in the growth rates of the two measures must be due to changes in the quality of output, q, or unaccounted changes in the price system:

$$\frac{dY}{Y} = \frac{dV}{V} + \frac{dq}{q} \tag{1}$$

The difficulty in applying equation (1) to estimate economic growth in East Germany is that q is not directly observable. However, the change in quality of aggregate output in a non-market economy vis-à-vis a market economy can be measured, as shown above, by the ability of a dynamic system to reproduce itself over time, i.e. by a comparison of the

27 Averages of the original series for West Germany are 0.44 and for East Germany 0.281 (both in 1985 DM and M).

incremental output-capital ratio in the planned economy (e.g. East Germany) to that of a "benchmark" market economy (e.g. West Germany), indicated by asterisks:

$$q \equiv \eta \frac{dV / dK}{dV^* / dK^*} = \eta \frac{IOCR}{IOCR^*}, \tag{2}$$

where η is a constant[28] and K is the reported capital stock. Then the rate of change in the quality index is:

$$\frac{dq}{q} = \frac{dIOCR}{IOCR} - \frac{dIOCR^*}{IOCR^*} \tag{3}$$

Substituting from (3) into (1) renders:

$$\frac{dY}{Y} = \frac{dV}{V} + \left(\frac{dIOCR}{IOCR} - \frac{dIOCR^*}{IOCR^*} \right) \tag{4}$$

The term *dV/dK* may be considered as a marginal productivity whose credibility depends on the quality of the data and that only can be evaluated under conditions of $dK \neq 0$. A quadratic trend was fitted to the East and West-German incremental output-capital ratios from 1951 to 1988; Table 6 gives the results.

Table 6:

Quadratic Trend of Index of Incremental Output-Capital Ratio, IOCR, for East Germany and West Germany (1950-1989)		
	East Germany	**West Germany**
constant	0.7297	1.1471
	(16.80)	(10.55)
t	-0.0390	-0.0664
	(8.411)	(6.726)
t^2	0.00060	0.0012
	(5.735)	(4.568)
adjR^2	0.8207	0.5577
n	40	40

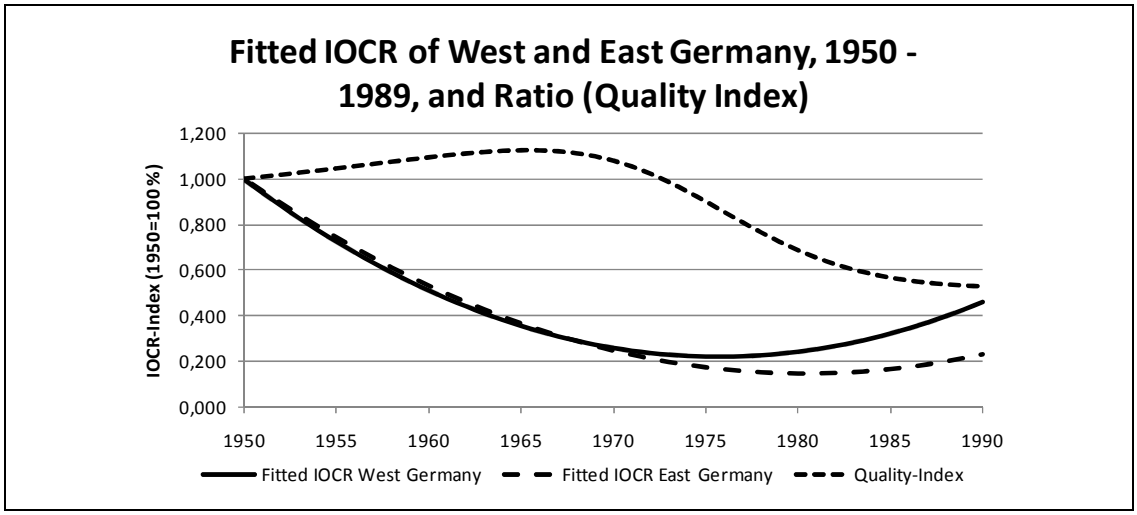
Source: Own calculations.

Fitted values (i.e. estimates of the original series using the above equations) and their ratio are shown in Figure 7. After remaining relatively stable in the 1950s and 1960s, this measure of quality fell sharply in the 1970s and 1980s. By 1988, the fitted ratio was 53 percent of its value in 1950. Applied to the East German data produced the results for East Germany given in Figure 8: Until the early 1970s, the observed values calculated by the East German Statistical Office and augmented, as described above, in order to be

28 It is only necessary to normalize values to unity at the beginning of the series; see Figure 6 and 7.

comparable to the concept of the GNP, are identical to the quality-corrected values. After this period, they start to deviate; in fact, a decline from the seventies until the mid eighties can be observed. By comparing the development of this quality index to that of the direction coefficient in Figure 4, striking similarities become apparent. In fact, both indicate a decline of quality to about half of the initial value.

Figure 7:



Source: Own calculations.

The decline in East German output from the 1970s onwards already visible in Figure 8 is affirmed. In 1972, on short notice, most of the still private enterprises or private enterprises with government interest (30% to 50% of equity) were confiscated when HONECKER came to power. The share of workers in socialist industries rose from 85.3% in 1970 to 94.6% in 1980[29]. In many cases, this also drove out the entrepreneurs. Especially deliveries of consumer goods to West Germany were affected. Following the statistics of the GDR[30], the larger private enterprises with a state interest employed about 6% of the "productive" workforce, but held 9 % of output[31]. This implies that they were roughly 50% more productive than the average economy, which means 60 % instead of 40 % of West German productivity. In addition, the globally changing patterns of raw material prices known as the "oil crisis" affected East Germany, especially inputs. Not only OPEC but also the Soviet Union adjusted process upward. Finally, increasing subsidies were necessary to stabilize prices of basic consumer needs. The East German analyst HAUSTEIN (1990, p. 214) observed that this diversion of funds from investment reduced output growth, led to declining productivity growth, and most importantly, a decline in the quality of goods since 1970. The corresponding loss of international competitiveness may have resulted in the current accounts crisis developing in the 1970s

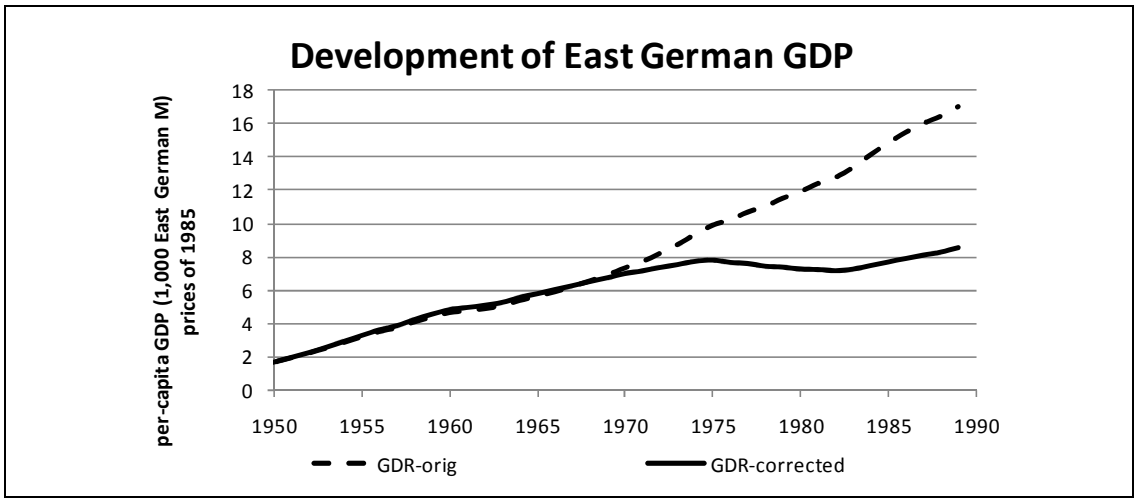
29 *Statistical Yearbook of East Germany*, 1985, p. 113.

30 *Statistical Yearbook of East Germany*, 1980, pp. 73 and 87.

31 See *Arp* (2005), p. 25; the book gives a precise account on the confiscations in that period.

and the severe liquidity crisis of 1982: The net debt position against western countries had by then risen to 25.1 DM which led to the famous "STRAUß-Kredit" from West Germany to bail out East Germany under the condition of dismantling some of the most atrocious killing devices at the border[32]. With the improvement of exports, this value decreased to 15.5 m DM until 1985, but then rose again to 19.9 m DM at the eve of unification (DEUTSCHE BUNDESBANK 1999, p. 59). The political system was unwilling and unable to use this last chance to reform the economic system (STEINER 2004).

Figure 8:



Source: Own calculations.

4.3 Robustness of Results

By adding cubic time trends to replaced or complement the regressors, an improvement of results was not possible. The assumption of joint residuals did not improve results. As Figures 6 and 7 show the impressive effects of productivity increases in Germany from the mid 1970s onwards, the effect of omitting last observations was tested.[33] The last nine years (until the beginning of the current accounts crisis) and the last 17 years (until the expropriations) to account for two effects: the strong upward trend in West German productivity at the end of the eighties and the two major events marking stagnation in East Germany. The results in Table 7 show a general robustness of the equation. However, the shortening of the sample leads to an increased "curvature" in the sense that bot the linear and the quadratic terms increase in absolute values. In fact, we see from Figure that the last years of East Germany have broken the upward trend: it is stronger in the estimate for the period until 1972 (dotted-broken line) than for the period

32 Note the discussion on this point in the memoirs of *Strauß* (1989), published after his death, but before unification and those of his negotiation partner *Schalk-Golodkowski* (2000), on the severity of the situation.

33 Omitting values at the beginning of the series only had minimal effects on the results.

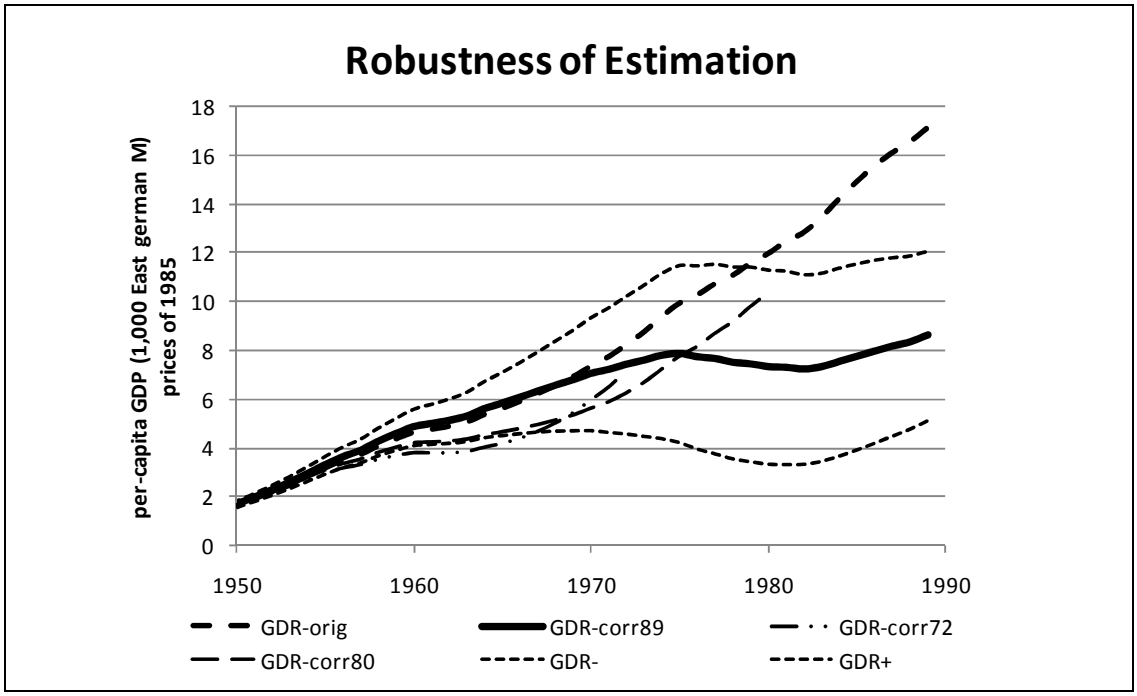
until 1980 (broken line) – but in both cases above the estimate that reach until 1989. For these series the 95% confidence intervals for the results of the East German growth estimation based on the West German reference (GDR+ and GDR-) were computed.

Table 7:

Quadratic Trend of Index of Incremental Output-Capital Ratio, IOCR, for East Germany and West Germany – Test of Robustness				
	East Germany 1950-1972	**East Germany 1950-1988**	**West Germany 1950-1972**	**West Germany 1950-1988**
constant	0.9361	0.8205	1.2880	1.1756
	(18.62)	(17.76)	(9.612)	(9.222)
t	-0.0826	-0.0559	-0.1006	-0.0736
	(9.359)	(8.987)	(4.275)	(4.287)
t^2	0.0022	0.0011	0.0027	0.0015
	(6.805)	(6.467)	(3.016)	(3.047)
adjR^2	0.8986	0.8560	0.6629	0.5754
n	23	31	23	31

Source: Own calculations.

Figure 9:



Source: Own calculations.

All results are shown in Figure 9. It is clear that dropping observations reduces the effect of the impressive regaining of productivity in West Germany. Evidently, it is highly improbable that East German output has been higher than two thirds of the officially re-

ported level. This upper bound is about the level reported by other authors, as will later be discussed.

4.4 The Economic Performance of 1989 and the Transition Crisis 1990

An important debate on the GDR's economic performance, and thus its end points of economic performance, was led when preparing German Monetary Union (GMU)[34]. In 1989/1990, the black market exchange rate in West Berlin was 6.5 East Mark for 1 DM. This value would reflect a productivity gap of 85%. The "official" exchange rate was 1:3 and seemed, at that time, acceptable as general exchange rate to the GDR government. It implied, for production costs, a rate of about 1:5.[35] This would imply an average productivity gap of 75%. This may compared to the per-capita product values of 1991, the first full year of East Germany with the DM as joint currency. The per-capita GDP (1995 prices) in the west was 25,160 € and in the east 8,322 €. The value computed for 1989 according to the corrections proposed is 8,598 €. Seemingly, these results suggest that no adaptation crisis can be found in these figures – contrary to what is known from transition literature. Two effects must be distinguished and treated separately:

- If a quality correction is applied, this implies that a strong devaluation of output has taken place. Insofar as the least productive plants are closed first and the least marketed goods are replaced first, their contribution to value added has – at least to a large extent – been discounted.
- From statistics and observations it is known that about two thirds of industrial workers lost their jobs and were redirected into part-time programs, early retirement, restructuring and training programs and unemployment. WELFENS (1996, p. 519) claims that after Monetary Union on July 1st, 1990, industrial output, which accounted for roughly one third of East German output,[36] fell about 25% until the end of 1990 and about halved until February 1991. Data from AKERLOF et al.(1991, Table 1 and 2) point into a similar direction: accounting for declines in prices of about 50% until the end of 1990, the industry's contribution to GDP should have fallen by 75%, Taking the share in the economy of about 42.2 % (STATISTICAL YEARBOOK OF THE GDR, 1989, p. 112), this effect alone should have reduced total output by some 30%. As other sec-

34 For a detailed survey, see *Nölling* (1991). The above data is taken from pages 22 – 23.

35 Because of ancillary labor costs that did not exist in the East German taxation system, this leverage has to be included.

36 If we depart from a workforce of about 8.6 m persons (without apprentices) and the number of about 3.2 m persons working in industry in 1989 halved, then output should fall by 18%. About 0,3 m persons left East Germany until 1991, partly looking for better jobs, partly because of unemployment.

tors, especially construction and retail as well as the public sector, remained stable in this first transition period and even strongly expanded afterwards, the proposition by DIW et al. (1999) that a decline of East German GDP was 35% over these two years may be exaggerated.

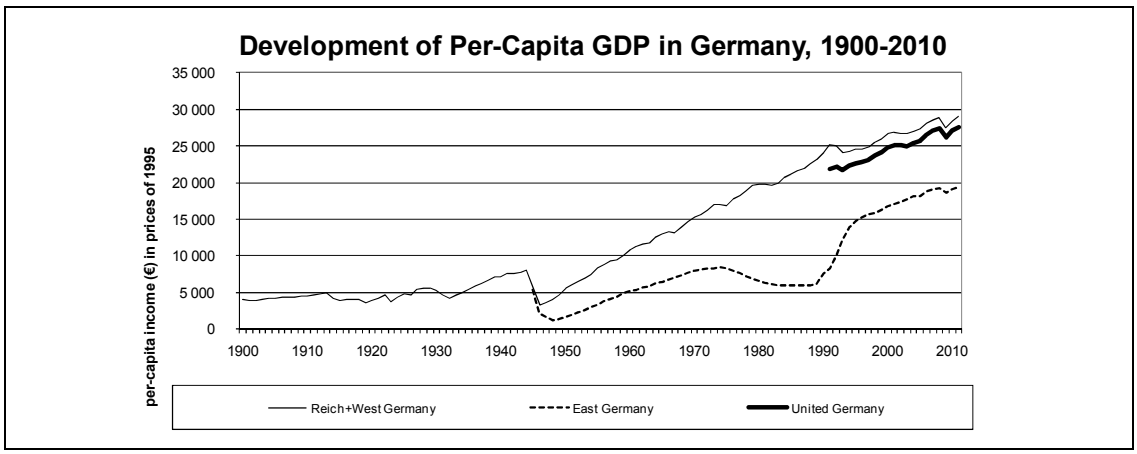
- This calculation however neglects the well known fact of large unemployment within the socialist firm theoretically derived by KORNAI (1980) and shown by KOWALSKI (1987) in the Polish case to be around 35% in administration and 20% in production. GÜRTLER, RUPPER and VOGLER-LUDWIG (1990) calculate some 15% for the average of East Germany. The above calculation of a decline of some 35% after 1989 would imply that, until 1996, no real improvement of the living standard in East Germany should have occurred. It would exclude the well documented facts about slack that necessitated labor shedding to a large extent. It neglects the many stabilizing effects were put in place. Especially social benefits indirectly contributed to GDP by stabilizing the demand side, especially for local goods.[37] Thus, the average output dip of 1990 should not exceed 15% if countervailing expansion effects are accounted for such as public housing, infrastructure investment etc. This is in line with the growth rates after Unification. Applying a growth rate of 20% – the average of the first three years after Unification to the period 1990/1991 and comparing the 1989 level to that calculated for 1991, a drop of around 10 % is obtained. However, it is very likely that monthly output values in winter 1990/1991 may have been 30% below pre-unification output.

Figure 10 visualizes the long-term development: Starting at one third of the West German level, East Germany was able to catch up to about 50% of the West German per-capita-GDP as a small Eastern Wirtschaftswunder had developed until the mid sixties. The seventies were a period of relative stagnation, the eighties of decline, the transition of a short but marked drop. The economy resumed, after a string initial expansion, the initial development path of the fifties and sixties.

Seemingly the maximum level of per-capita output was close to the 1938 output levels of the German Reich. Statistics from the Central German Business District, which became the GDR after the war, show that its southern half (Berlin and southwards) was about 20% wealthier than the rest of the nation.

37 Household income in 1991 had already reached 54% of the West German (*DIW, IfW, IWH*, 1999, p. 210); 60% are considered necessary to eliminate incentives to migrate to the west as this level represents the welfare level of the west.

Figure 10:



Source: Own calculations.

The two initial hypotheses that (i) the communist economy prior to Unification was on a stagnating path contrary to what standard analyses show; (ii) that strong elements of path dependence exist and that the switch from plan to market offset the pre-unification stagnation but was not able to repair structural deficits inherited from the past, become very visible in Figures 10 and 12. In fact, accelerated growth in the nineties was nothing but a compensation of growth potentials lost in the seventies and the eighties. And the convergence to West German performance levels will remain arduous for quite some time. In fact, Figure 12 suggests that the annual speed of convergence is some 0.4 percentage points. Because of differences in settlement structure and population density, the West German average is not the true reference point. If from the West German Lander City-Lander and agglomerations like Munich, Frankfurt or Cologne-Düsseldorf are excluded, than a benchmark of some 90 % of West Germany seems economically sound and achievable (BLUM, LUDWIG et. al. 2011, p. 57). This would still take more than fifty years, a value also computed by LUDWIG and SCHEUFELE (2009).

5. Comparison of Results to those from other Studies

Finally, the series calculated in this study ("GDR_B2011") are compared to the results of other analyses:

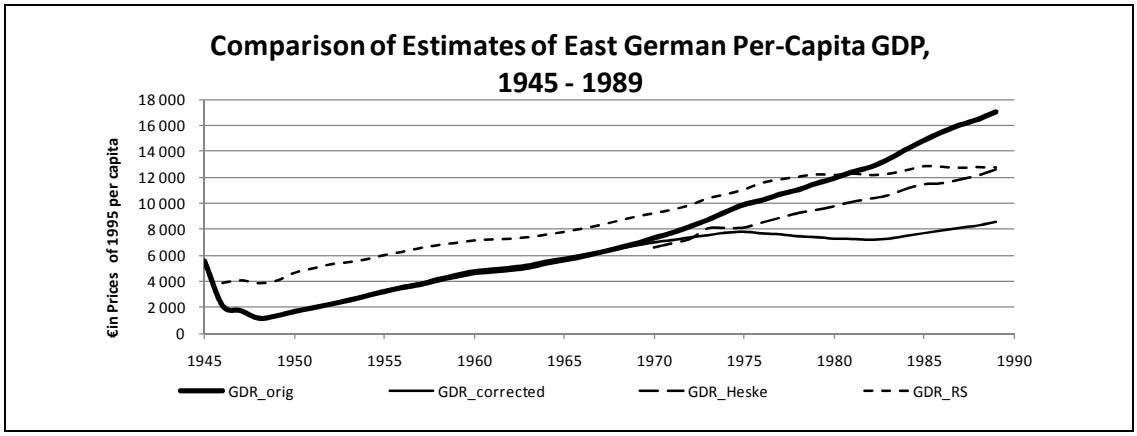
- the original series of East Germany ("GDR_orig"), which were recalculated in order to included non-productive sectors, but based on the Material Product System as accounting standard;
- The series computed by HESKE (2005) for East Germany ("GDR_Heske"); this series is given in prices of 1995 and thus, no revaluation was needed; it only covers the years from 1970 to 1989.

- RITSCHL and SPOERER (1997) provide long annual GDP series for East, West and the total of Germany ("GDR_RS") based on prices of 1913; they had to be revalued using the 1950 to 1955 official West German GDP data.

The results are shown in Figure 12. By methodology, GDR_orig and GDR_corrected have the same starting points in 1950 (and for the preceding years). The ending points in 1989 of the HESKE and the RITSCHL/SPOERER series are some 4,000 € in per-capita income below the official East German statistic and above those computed here. Given a measured per-capita GDP of 8,322 € in 1991, this result implies that transition had lowered output by 35% which is consistent with the value that DIW, IfW and IWH (1999) had proposed. And in addition, it implies that East Germany stood on a growth path at the end of the 1980s that abruptly came to a standstill with transition – clearly for the official East German series and the HESKE series, to a lesser degree for the RITSCHL/SPOERER series.

These results do not contradict the second hypothesis of a permanently lower growth path for East Germany. Only the economic downswing and consecutive stagnation starting in the seventies is replaced by a more dynamic development until 1989, which is in full opposition to the stagnation hypothesis.

Figure 11:



Source: Own calculations.

This raises the following questions:

- How can these results be accommodated with the internal view that East Germany was, as the SCHÜRER-Report in summer 1989 (SCHÜRER et al., 1989) had suggested, stagnating or even bankrupt by 1989. And why did it so desperately need foreign cash in 1981 if development was so smooth?
- As the West German per-capita GDP value of 1989, when the five series end, is 23.173 €, the official East German series reaches more than two thirds of the West German level. Based on the HESKE/RIETSCHEL/SPÖRER values, which are

55% of the West German level, it becomes difficult to understand why transition was so hard (or even necessary). It would have exactly matched the average exchange rate at currency union of 1:1.7. DIW (1990) computes a slightly lower value of about 11,500 Euro per inhabitant in 1989 (1995 prices). By comparing them to West German values in the same study, a ratio of 49% is derived.[38] In fact, under these conditions Unification should have been much less arduous. And as the drive to unification had a strong economic momentum, as East Germany already acknowledged in the SCHÜRER-Report, it could have been avoided.

- Given a much better starting point and putting most of the blame of growth not to fundamental structural problems but to problems of the economic system, why East Germany was not able to step on a higher growth path after the initial expansion?

Note that these values are slightly below those given by FILIP-KÖHN and LUDWIG (1990), which are about 9,000 Euro/inhabitant for 1988 and about 40% of the level of the west.[39]

Seemingly, contrafactual evidence leads to the conclusion that East Germany's true economic development is better portrayed by the series proposed in this study and that two aspects have to be included if analyze East Germany's development path is to be analyzed: (i), long-term structural problems produced by communism and the fleeing of elites and – from an economic perspective – dominant economic units ("headquarter facilities") that were not compensated with unification; (ii), on and above these effects a reckless centralization and subsidization policy from 1971 onwards that drove the system into underinvestment and stagnation but could be offset after unification.

Finally, the 1985 per-capita GDP value of the STATISTSCHE BUNDESAMT (2000, p. 69; p. 89) of 16,665 M is applied to the average conversion rate of 1 : 1.7 at unification, a value is obtained (9,707 M of 1985 that is close to the quality-adjusted results calculated here (10,201 M).[40]

38 It was impossible to resolve the question, why the value accumulated by *Wegner* shows 53% (Table 1).

39 Again, it was not feasible to resolve the question, why *Wegener* gave a value of 57% in his study (Table 1).

40 As mentioned before, internal values of East Germany and external values differed. In 1985, the external exchange rate was 1:2.6 ; see *Statistsches Bundesamt* (2000, p. 69). The RiKo was already at 1:2.96 .

6. The Consolidated Picture

Rarely has it been possible to analyze the economic development of a country from its beginning to its end. East Germany is such a case, and the explication of its failure – and the ill perception of its true economic performance – can be found in two elements: Its starting position in the late forties of last century, which many considered as better than it really was, because it lay ground to fundamental structural problems of East Germany that have not yet been overcome; the severing conditions from the 1970s by recklessly centralizing the economy and satisfying consumer needs of the population at the expense of sustainable growth, which led to a balance of payments crisis in 1981 and in 1988. In 1989, the political and economic system of East Germany collapsed. After a short and dynamic expansion, convergence to West German income levels has stalled at around 70%.

The long-term development path of East Germany has not changed since the late forties of last century. The communist system laid ground to a loss of human capital and a less efficient innovation system. Its visible sign are the company headquarters that fled and – until today – have not come back and could not be compensated by combines unable to survive transition.

The stagnation that started in the seventies and well reached into the eighties of last century was compensated within few years after unification by accelerated growth only to lead the East, from the end nineties on, in back to its long-term economic trajectory. Any policy that wants to break this trend has to confront the stubbornly stable structural deficiencies of the East German economic system.

Quality corrected peak production of the GDR, which was reached in the early 1970s has never passed the output of the Central German Industrial District in the late 1930s (BAYERISCHES STATISTISCHES LANDESAMT 1936). Although data on regional output is not available, this region had above average high energy consumption, tax generation, car ownership or telephone availability – characteristics that are highly correlated with economic performance. In fact looking at this result, the economic life of the GDR was "in vain".

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